WHAT IS CLAIMED IS:

1   1. A method comprising:

2   receiving image data; and

3   executing an averaging instruction to average a plurality of pixels of the image

4   data;

5   wherein executing the averaging instruction generates a set of four-pixel averages,

6   each four-pixel average generated from two pixels in a first source register

7   and two pixels in a second source register; and

8   wherein executing the averaging instruction comprises:

9   adding successive pixels from the first source register to successive pixels

10   of the second source register generating a plurality of intermediate

11   results; and

12   adding two of the plurality of intermediate results and repeating with

13   different combinations of the plurality of intermediate results

14   generating a plurality of sum results.

15   2. The method as recited in Claim 1, wherein the two pixels in the first source

16   register and the two pixels in the second source register are adjacent pixels in an image.

17   3. The method as recited in Claim 2, wherein the adjacent pixels are adjacent in

18   both horizontal and vertical dimensions.

19   4. The method as recited in Claim 1, wherein the executing the averaging

20   instruction further comprises:

21   discarding the two least significant bits of each sum result of the plurality of sum

22   results generating the set of four-pixel averages.

23   5.   The method as recited in Claim 1, wherein the first source register comprises a

24   plurality of pixels from a first row of pixels and the second source register comprises a

25   plurality of pixels from a second row of pixels, and wherein the first row is adjacent to

26   the second row in an image.

27   6.   The method as recited in Claim 5, further comprising:

28   repeating the executing the averaging instruction for all pixels in the image; and

29   discarding a portion of generated four-pixel averages, generating a down-scaled

30   image.

31   7.   The method as recited in Claim 6, wherein the discarding the portion of the

32   generated four-pixel averages comprises:

33   masking every other four-pixel average using a AND operation;

34   executing a pack instruction that compresses two eight element registers into a

35   single eight element register generating the down-scaled image.

36   8.   The method as recited in Claim 1, wherein the set of four-pixel averages

37   comprise interpolated pixel values utilized for video coding.

38   9.   The method as recited in Claim 8, wherein the video coding is a motion

39   estimation encoding.

40   10. The method as recited in Claim 8, wherein the video coding is a motion

41   compensation decoding.

42   11. The method as recited in Claim 1, wherein the set of four-pixel averages are

43   utilized for image color space conversion.

44   12. The method as recited in Claim 1, wherein the set of four-pixel averages are

45   utilized for image color format conversion.

46   13. The method as recited in Claim 1, wherein the first source register comprises a

47   plurality of pixels from a first row of pixels and the second source register comprises a

48   plurality of pixels from a second row of pixels, and wherein the first row is from a

49   different image than the second row.

50   14. The method as recited in Claim 13, wherein the set of four-pixel averages

51   comprise averaged pixel values utilized for motion estimation video encoding.

52   15. The method as recited in Claim 13, wherein the set of four-pixel averages

53   comprise averaged pixel values utilized for motion compensation video decoding.

54   16. The method as recited in Claim 1, wherein the averaging instruction is a

55   Single-Instruction/Multiple-Data (SIMD) instruction.

56   17. The method as recited in Claim 1, wherein the first source register comprises a

57   plurality of pixels from a row of pixels and the second source register comprises another

58   plurality of pixels from the row of pixels, and wherein each pixel of the plurality of pixels

59   is adjacent in an image to at least one pixel of the another plurality of pixels.

60   18. The method as recited in Claim 17, wherein the executing the averaging

61   instruction comprises a portion of a separable filter implementation.

62   19. A system comprising:

63   an addressable memory to store an instruction for an averaging operation;

64   a processing core coupled to the addressable memory, the processor core

65   comprising:

66   an execution core to access and execute the instruction;

67   a first source register to store a first plurality of pixels;

68   a second source register to store a second plurality of pixels; and

69   a destination register to store a plurality of results of the averaging

70   operation;

71   a wireless interface to receive a digital signal comprising a third plurality of

72   pixels; and

73   an I/O system to provide the first and second plurality of pixels to the first and

74   second source registers from the third plurality of pixels;

75   wherein to execute the instruction, the execution core is operative to:

76   generate a set of four-pixel averages, each four-pixel average generated

77   from two pixels in the first source register and two pixels in the

78   second source register.

79   20. The system as recited in Claim 19, wherein to generate the set of four-pixel

80   averages the execution core is operative to:

81   add successive ones of the first plurality of pixels to successive ones of the second

82   plurality of pixels generating a plurality of intermediate results;

83   add two of the plurality of intermediate results and repeating with different

84   combinations of the plurality of intermediate results generating a plurality

85   of sum results; and

86   discard the two least significant bits of each sum result of the plurality of sum

87   results generating the set of four-pixel averages.

88   21. The system as recited in Claim 19, wherein the first source register comprises

89   a plurality of pixels from a first row of pixels and the second source register comprises a

90   plurality of pixels from a second row of pixels, and wherein the first row is adjacent to

91   the second row in an image.

92   22. The system as recited in Claim 19, wherein the first source register comprises

93   a plurality of pixels from a first row of pixels and the second source register comprises a

94   plurality of pixels from a second row of pixels, and wherein the first row is from a

95   different image than the second row.

96   23. The system as recited in Claim 19, wherein the first source register comprises

97   a plurality of pixels from a row of pixels and the second source register comprises

98   another plurality of pixels from the row of pixels, and wherein each pixel of the plurality

99   of pixels is adjacent in an image to at least one pixel of the another plurality of pixels.

100   24. The system as recited in Claim 19, wherein the averaging instruction is a

101   Single-Instruction/Multiple-Data (SIMD) instruction.

102   25. A system comprising:

103   an addressable memory to store an instruction for an averaging operation;

104   a processing core coupled to the addressable memory, the processor core

105   comprising:

106   an execution core to access and execute the instruction;

107   a first source register to store a first plurality of pixels;

108   a second source register to store a second plurality of pixels; and

109   a destination register to store a plurality of results of the averaging

110   operation;

111   a video capture interface to receive a digital signal comprising a third plurality of

112   pixels; and

113   an I/O system to provide the first and second plurality of pixels to the first and

114   second source registers from the third plurality of pixels;

115   wherein to execute the instruction, the execution core is operative to:

116   generate a set of four-pixel averages, each four-pixel average generated

117   from two pixels in the first source register and two pixels in the

118   second source register.

119   26. The system as recited in Claim 25, wherein the first source register comprises

120   a plurality of pixels from a first row of pixels and the second source register comprises a

121   plurality of pixels from a second row of pixels, and wherein the first row is adjacent to

122   the second row in an image.

123   27. The system as recited in Claim 25, wherein the first source register comprises

124   a plurality of pixels from a first row of pixels and the second source register comprises a

125   plurality of pixels from a second row of pixels, and wherein the first row is from a

126   different image than the second row.

127   28. The system as recited in Claim 25, wherein the first source register comprises

128   a plurality of pixels from a row of pixels and the second source register comprises

129   another plurality of pixels from the row of pixels, and wherein each pixel of the plurality

130   of pixels is adjacent in an image to at least one pixel of the another plurality of pixels.

131   29. The system as recited in Claim 25, wherein the instruction is a Single-

132   Instruction/Multiple-Data (SIMD) instruction.

133   30. An article comprising a machine-readable medium that includes machine

134   readable instructions, the instructions operative to cause a machine to:

135   receive image data; and

136   execute an averaging instruction to average a plurality of pixels of the image data,

137   wherein executing the averaging instruction generates a set of four-pixel

138   averages, each four-pixel average generated from two pixels in a first

139   source register and two pixels in a second source register.

140   31. The article as recited in Claim 30, wherein the first source register comprises a

141   plurality of pixels from a first row of pixels and the second source register comprises a

142   plurality of pixels from a second row of pixels, and wherein the first row is adjacent to

143   the second row in an image.

144   32. The article as recited in Claim 31, wherein the instructions are further

145   operative to cause the machine to:

146   repeat the executing the averaging instruction for all pixels in the image; and

147   discard a portion of generated four-pixel averages, generating a down-scaled

148   image.

149   33. The article as recited in Claim 32, wherein the instructions operative to cause

150   the machine to discard the portion of generated four-pixel averages comprise:

151   an AND instruction to mask alternating four-pixel averages; and

152   a PACK instruction to compress two eight element registers into a single eight

153   element register to generate the down-scaled image.

154   34. The article as recited in Claim 30, wherein the first source register comprises a

155   plurality of pixels from a first row of pixels and the second source register comprises a

156   plurality of pixels from a second row of pixels, and wherein the first row is from a

157   different image than the second row.

158   35. The article as recited in Claim 30, wherein the averaging instruction is a

159   Single-Instruction/Multiple-Data (SIMD) instruction.

160   36. The article as recited in Claim 30, wherein the averaging instruction is

161   operative to cause the machine to:

162   add successive pixels from the first source register to successive pixels of the

163   second source register generating a plurality of intermediate results;

164   add two of the plurality of intermediate results and repeating with different

165   combinations of the plurality of intermediate results generating a plurality

166   of averaging results; and

167   discard the two least significant bits of each averaging result of the plurality of

168   averaging results generating the set of four-pixel averages.

169   37. The article as recited in Claim 30, wherein the first source register comprises a

170   plurality of pixels from a row of pixels and the second source register comprises another

171   plurality of pixels from the row of pixels, and wherein each pixel of the plurality of pixels

172   is adjacent in an image to at least one pixel of the another plurality of pixels.

173   38. The article as recited in Claim 37, wherein the executing the averaging

174   instruction comprises a portion of a separable filter implementation.